# Business Case

## Context

With the AutomationML Engine there is an API which makes it easy for software to work interoperate with **Automation** **M**arkup **L**anguage (AutomationML) files. Further information about this topic can be found in the customer requirements specification.

## Objectives

The objectives of this project will be to realize the project with minimal risks and acceptable costs. In order to achieve that, further planning needs to be done. This will contain a **C**ustomer **R**equirements **S**pecification (CRS), **S**ystem **R**equirements **S**pecification (SRS), this **B**usiness **C**ase (BC) and a **P**roject **M**anual (PM).

## Benefits and Impact

The only currently maintained version is written in C#, which limits its usefulness. Having versions in other languages would make it easier and less time consuming for companies to integrate AML support into their software.
This proposal includes the creation of wrappers for the AML.Engine.dll in C++ and JavaScript as well as the documentation of those wrappers and their implementation. Additionally, the development of a console application which includes a parser for AML and AMLX files and returns meaningful error messages. Furthermore, the application also allows to decompress and compress AMLX files.

Everything has to be finished by Mai 15th, 2020. Further details are documented in the customer requirements specification.

# Benefits

## Monetary Upsides

The project results provide a C++ and JavaScript wrapper, so future projects in C++ or JavaScript will not require additional time to implement the Dynamic Link Library (DLL).

# Costs

| Role | Rate per Hour |
|---|---|
| Software Developer | 55,16 € |
| Project Manager | 79,94 € |
| Product Manager | 78,02 € |
| Lead Developer | 62,65 € |
| Test Manager | 68,77 € |
| Technical Writer | 50,78 € |

| Phase | Absolute Cost |
|---|---|
| Requirement Analysis | 24.098 € |
| Design | 11.164 € |
| Coding | 22.935 € |
| Testing | 20.424 € |
| Documentation (User Manual) | 15.081 € |
| **Total** | **93.702 €** |

This is how we calculated our costs:

*Requirement Analysis*: To calculate the requirement analysis costs, the product manager's hourly rate of 26 days for 6 employees with 8 hours/day were used.

*Design*: To calculate the design costs, the lead developer's hourly rate of 15 days for 6 employees with 8 hours/day were used.

*Coding*: To calculate the coding costs, the developer's hourly rate of 35 days for 6 employees with 8 hours/day were used.

*Testing*: The test manager's hourly rate of 25 days for 6 employees with 8 hours/day were used to calculate the testing costs.

*Documentation (User Manual)*: The hourly rate of the technical writer for 25 days for 6 employees with 8 hours/day were used to calculate the documentation costs.

Since the team is only made up of students, fixed costs for the premises, ancillary costs and similar costs ignored, as they have no significance for the project.

# Summary

| | |
|---|---|
| Staff Costs | 93.702 € |
| License Fees | 1.440 € |
| Fixed Costs | 0€ |
| **Total Costs** | 95.142 € |
| Profit margin (38,6%) | 36.154€ |
| **Quoted Price** | 132.000€ |

# Risk analysis

| Type | Risk | Probability | Impact | Consequences | Countermeasure |
|---|---|---|---|---|---|
| Personal | Long-term illness | low | medium | Project delayed | Overtime |
| Personal | Exmatriculation | low | high | Project delayed | Overtime |
| Personal | Conflicts between team members | low | medium | bad work ethic, poor morale | Communication, Mediation |
| Technical | Incomplete AMLEngine documentation | high | medium | Incomplete product | Code-Research |
| Require-ments | Change | low | high | Change of Requirements | Communication, specific SRS |
| Estimation | underestimated time expenditure | medium | medium | Project delayed | Overtime |
| Tools | Missing Knowledge | medium | high | Project delayed | Research, knowledge exchange, task delegation |

# Conclusion/Summary

AutomationML becomes more and more important in our times, as automation of production is a crucial cost factor. Therefore, a lot of companies are currently investing in knowledge on this topic. It is safe to say that the project's cost of ~100 000 € are a good investment, since it will make a difference when working on projects using the AMLEngine in the future.
As shown above, there are some risks associated with the project. Even considering these risks, the project is economically viable and should be realizable.